DESCRIPTIONS OF NEW AND LITTLE-KNOWN SIPHONAPTERA

By F. G. A. M. SMIT

SYNOPSIS

Six new fleas are described in this paper and two imperfectly known species are redescribed. Unless stated otherwise, all type specimens are in the Rothschild collection and the British Museum collection of Siphonaptera at Tring, Herts.

Family Vermipsyllidae

Dorcadia ioffi, n. sp.[1]

(Figs. 1, 3)

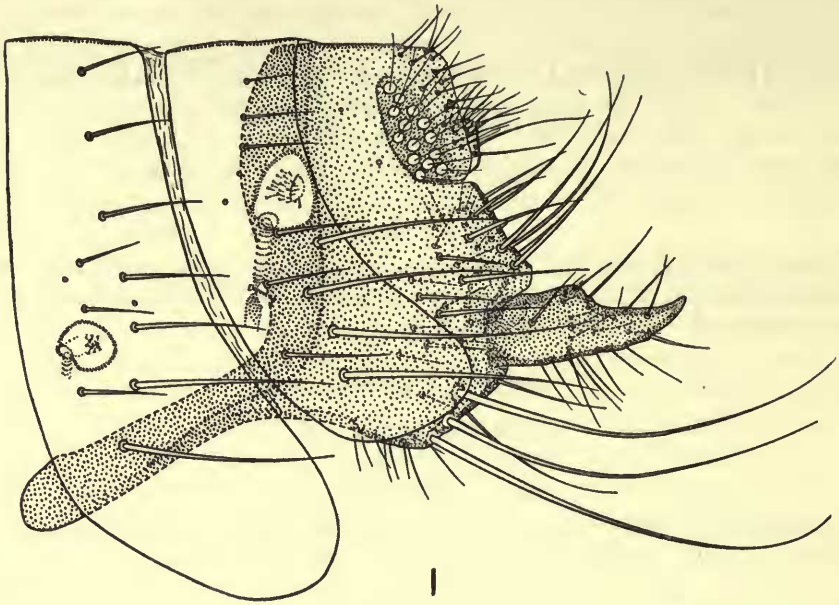
Type material. Holotype male and allotype female: Issyk-Kul, Tien Shan, Turkestan, 1943, ex *Ovis aries*, received from I. G. Ioff. Paratypes: two females with same data as holotype and allotype.

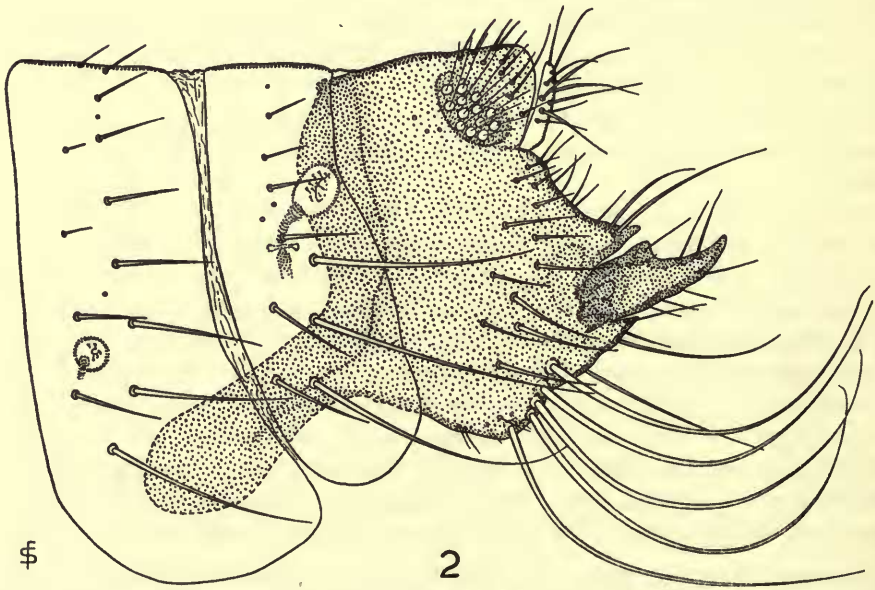
Diagnosis. Closely related to the hitherto only known representative of the genus, *Dorcadia dorcadia* (Rothschild), 1912, but readily distinguishable in both sexes by the much larger size of the abdominal spiracular fossae; the male differs in the shape and proportions of the modified segments, the female likewise in the terminal segments, though less markedly so.

Description. Apart from the larger size of the spiracular fossae and the details of the terminalia, there do not seem to be any major differences in the two species of *Dorcadia*.

Modified abdominal segments: male (Fig. 1, cf. Fig. 2). Manubrium rather narrow, about five times as long as broad at its apically broadest point, in *D. dorcadia* about two and a half times as long as broad. The posterior margin of the clasper above the movable process bears about half a dozen long setae at or near the margin which is truncate just above the movable process; in *D. dorcadia* only 2 of the marginal setae are elongated and the margin above the movable process forms an acute process. Along the margin of the clasper below the movable process 3 very long curved setae; in *D. dorcadia* there are 4–5 such setae. On the outer side of the clasper a vertical patch of about 6 setae, on the corresponding part, but on the inside, about 16 small setae; in *D. dorcadia* on the outer side about 12 setae, but none on its inner side. Movable process proportionally longer than that of

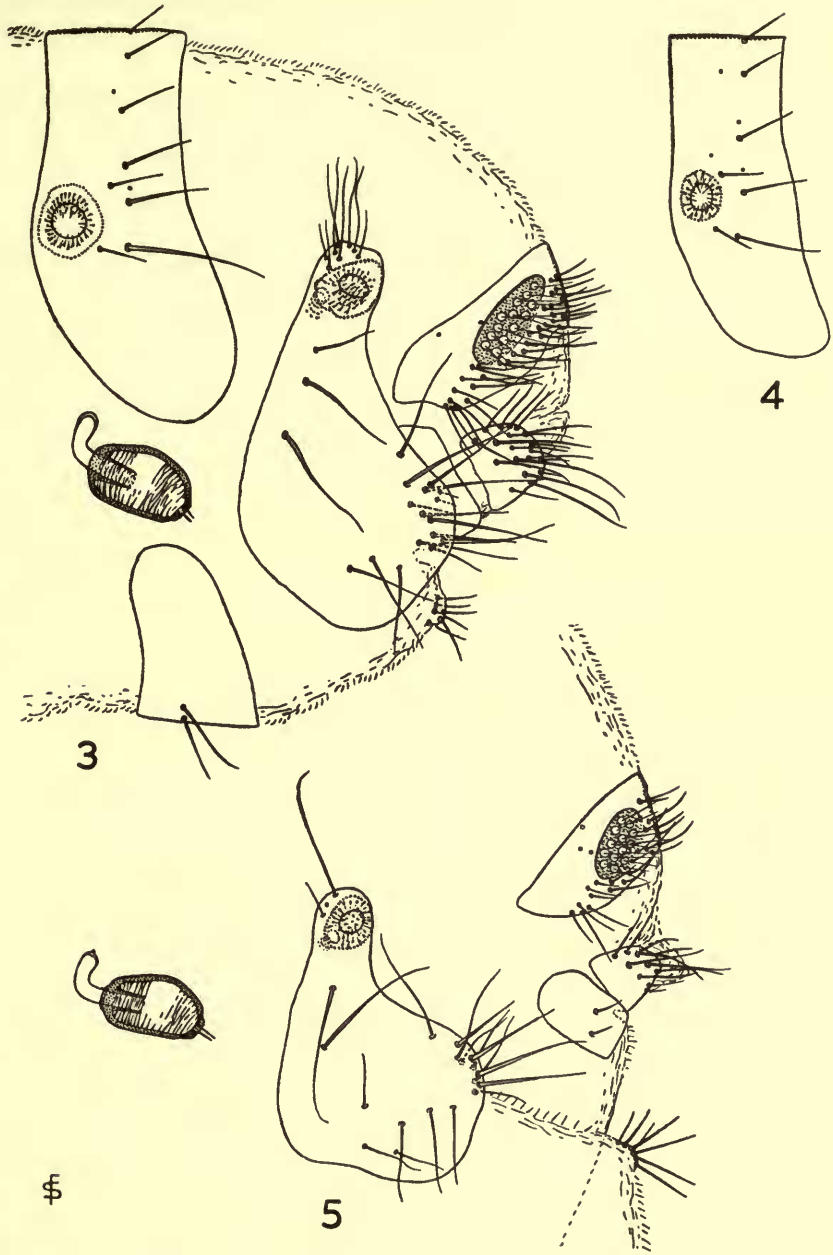
[1] The specimens of this new species (*Dorcadia*) and the next one described here (*Chaetopsylla*) were among material received in 1946 from Prof. I. G. Ioff of the Parasitological Laboratory at Saratov, U.S.S.R., in exchange for material from the Tring collection. Since then it has become practically impossible to communicate with colleagues in Russia, and I have not been able to inform Professor Ioff of the status of the specimens which are now here described as new. To describe new species without the consent of the colleague who submitted the material for study and comments would normally be unethical, but in this case the increase of our knowledge seemed to outweigh this consideration—a view which is shared by my colleagues at Tring.





FIGS. 1, 2.

Fig. 1, *Dorcadia ioffi* n. sp. Terga VII, VIII and clasper (tergum IX) and anal segment. (Holotype.) Fig. 2, *Dorcadia dorcadia* (Rothschild). Terga VII, VIII and clasper (tergum IX) and anal segment. (Yen-an Fu, Shensi.)



FIGS. 3–5.

Fig. 3, *Dorcadia ioffi* n. sp. Terminalia of female. (Allotype.) Fig. 4, *Dorcadia dorcadia* (Rothschild). Tergum VII. (Yen-an Fu, Shensi.) Fig. 5, *Dorcadia dorcadia* (Rothschild). Terminalia of female. (Yen-an Fu, Shensi).

the other species and with more numerous setae. In both species the dorsal anal lobe (tergum X) is fused with tergum IX; the ventral anal lobe (sternum X) is distinctly longer in the new species than in *D. dorcadia*. The very peculiar phallosome is extremely similar in the two species.

FEMALE (Fig. 3, cf. Figs. 4, 5). This is a larger flea than *D. dorcadia* (although the reverse appears true owing to the lesser degree of expansion of the available females of *D. ioffi*), and the fact that its tergal and sternal sclerites are larger (cf. Figs. 3 and 4, 5) may be due to this fact, but they are also distinctly broader and with a more convex anterior margin, as shown in the figures. The spiracular fossae are actually and relatively larger; above the spiracular fossa of tergum VIII about 8 upwards-pointing setae, while in *D. dorcadia* there are only 2 or 3 such setae; the setae behind and below the sensilium and on the ventral anal lobe are also more numerous than in *D. dorcadia*. The spermathecae of the two species are very similar.

LENGTH OF MALE, 3 mm.; the length of the female cannot be given in a satisfactory way, owing to the different stages of expansion of the specimens.

REMARK. This new species is named in honour of the great Russian Siphonapterologist, Prof. I. G. Ioff.

Chaetopsylla caucasica, n. sp.

(Figs. 6, 8, 10, 12)

TYPE MATERIAL. Holotype male and allotype female: Kisha, N.W. Caucasus, 1940, ex *Martes martes*, received from Prof. I. G. Ioff.

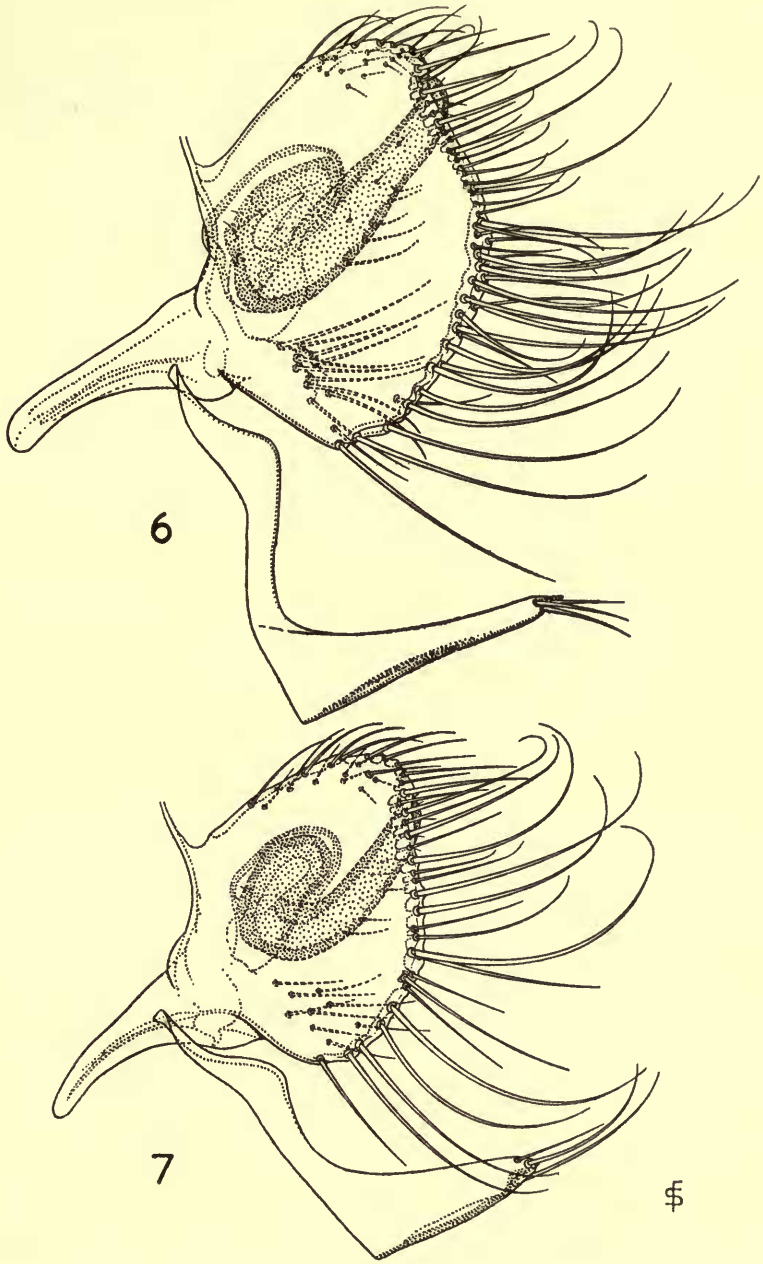
DIAGNOSIS. The new species is closely related to *Chaetopsylla matina* Jordan, and differs from it in the male by the shape of the corpus of the clasper, the straightness of the movable process and the greater length of the distal arm of sternum IX; the female is difficult to distinguish from that of *C. matina*, except for a difference in the shape of the spermatheca.

DESCRIPTION: HEAD. Frontal tubercle deciduous; labial palp consisting of 5 segments, not extending beyond the apex of the fore coxa. Without a strong seta on the genal process immediately below the hinder part of the eye.

THORAX. Metepimeron with 2 rows of setae, the anterior row being well developed and composed of 4 or 5 setae.

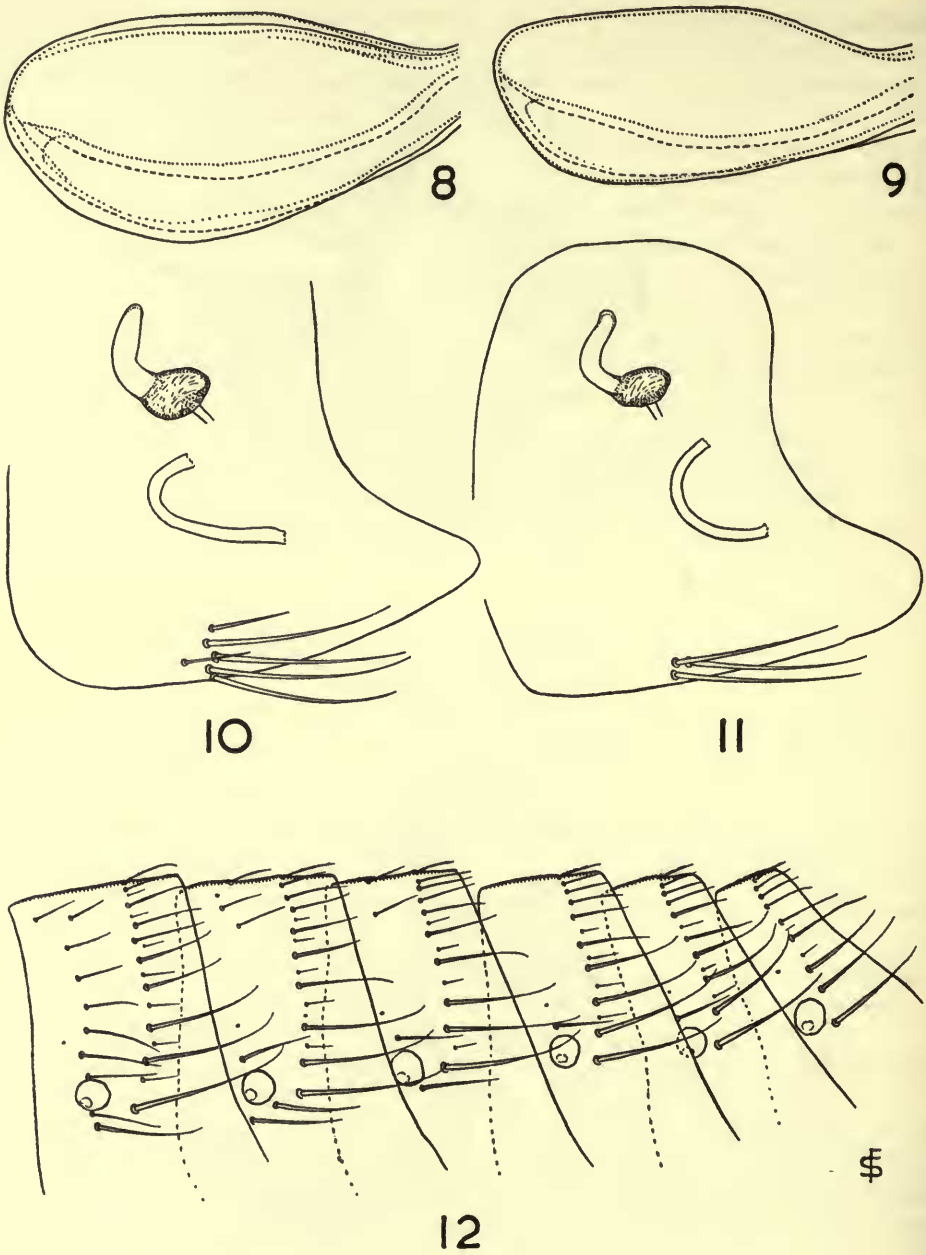
ABDOMEN. The setae of the terga are not notably long and coarse; for the arrangement of setae below or behind the spiracular fossae of terga II–VII see Fig. 12; in the female these spiracular fossae are situated well in front of the short main tergal row of setae and there are in this sex two setae above the spiracular fossa of tergum II, and one above those of terga III–VII.

MODIFIED ABDOMINAL SEGMENTS: MALE (Figs. 6, 8, cf. Figs. 7, 9). Corpus of clasper about one and a half times as long as broad, as in *C. matina*, but its posterior margin is strongly convex; the setae along this margin far more numerous than in *C. matina*; setae on the lower part of the inner side of the corpus longer and more distinctly grouped together than in *C. matina*. Movable process apparently straight



FIGS. 6, 7.

Fig. 6, *Chaetopsylla caucasica* n. sp. Clasper and sternum IX. (Holotype.) Fig. 7, *Chaetopsylla matina* Jordan. Clasper and sternum IX. (Cauterets, Hautes Pyrenées.)



FIGS. 8–12.

Fig. 8, *Chaetopsylla caucasica* n. sp. Aedeagal apodeme. (Holotype.) Fig. 9, *Chaetopsylla matina* Jordan. Aedeagal apodeme. (Cauterets, Hautes Pyrenées.) Fig. 10, *Chaetopsylla caucasica* n. sp. Sternum VII, spermatheca and sclerotized part of the ductus bursae copulatricis. (Allotype.) Fig. 11, *Chaetopsylla matina* Jordan. Sternum VII, spermatheca and sclerotized part of the ductus bursae copulatricis. (Cauterets, Hautes Pyrenées.) Fig. 12, *Chaetopsylla caucasica* n. sp. Terga II–VII of male. (Holotype.)

(that of the right-hand side is curved in the only male available, but this shape seems to be due to distortion) ; the process narrows markedly at two-thirds and is then of uniform width to near the apex, where it tapers gradually ; the acetabulum is situated at the anterior margin of the corpus, while in *C. matina* it is placed well away from this margin. Manubrium with a straight upper and a convex lower margin. Proximal arm of sternum IX more distinctly angulate than that of *C. matina*, while the distal arm is slenderer and relatively much longer than in the latter species and bears apically a few rather short setae (not long ones as in *C. matina*). Aedeagal apodeme much broader than that of *C. matina*.

FEMALE (Fig. 10, cf. Fig. 11). Sternum VII very much like that of *C. matina*, but the ventral lobe appears to be sharper, although females of *C. matina* are rather variable in this respect. Tergum VIII with a main row of 11 setae on one side, 12 on the other, on each side the 6 lower and larger setae of this row are situated below the spiracular fossa. Appendix of spermatheca relatively stouter than that of *C. matina*, while the reservoir also appears to be much larger in relation to the length of the appendix. The sclerotized part of the ductus bursae copulatricis is less strongly bent than that of *C. matina*, but whether this shape is genuine or not cannot be ascertained from the only female available.

LENGTH OF MALE, 2½ mm. ; female approximately 3½ mm.

Family STEPHANOCIRCIDAE

Subfamily CRANEOPSYLLINAE

Cleopsylla monticola, n. sp.

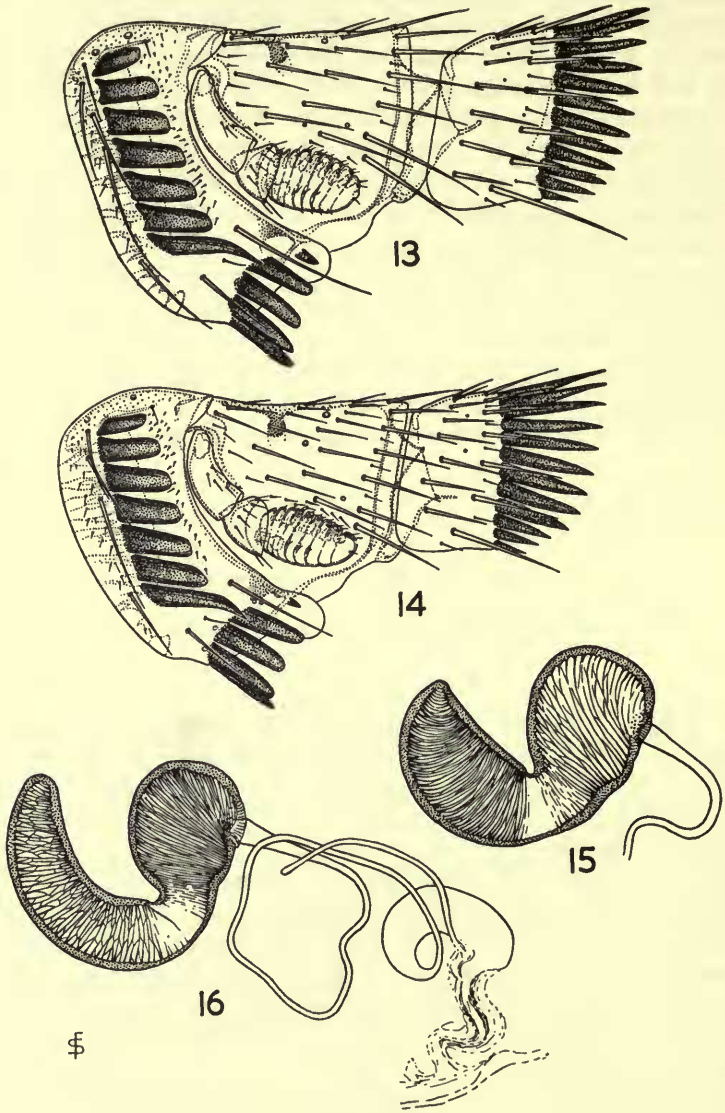
(Figs. 13, 15, 17, 19, 21)

TYPE MATERIAL. Holotype male and allotype female : Pichincha, Ecuador, 1st October, 1931, ex *Caenolestes fuliginosus*, collected by F. Spillmann. Paratypes : one male and one female, Chimborazo, Ecuador, April, 1931, ex *Sigmodon* sp. ; one male, Iliniza, Ecuador, April, 1931, ex *Thomasomys* sp. ; these paratypes were also collected by F. Spillmann.

DIAGNOSIS. This new species from Ecuador differs from the hitherto only known representative of the genus, *Cleopsylla townsendi* Rothschild (occurring in Peru), by the straightness of the anterior margin of the frons, the strongly reduced number of small setae bordering the antennal fossa dorsally, and by the chaetotaxy of the hind tibia. The modified abdominal segments and genitalia of the male are extremely similar in the two species, but the females are most easily distinguishable by the shape of the spermatheca.

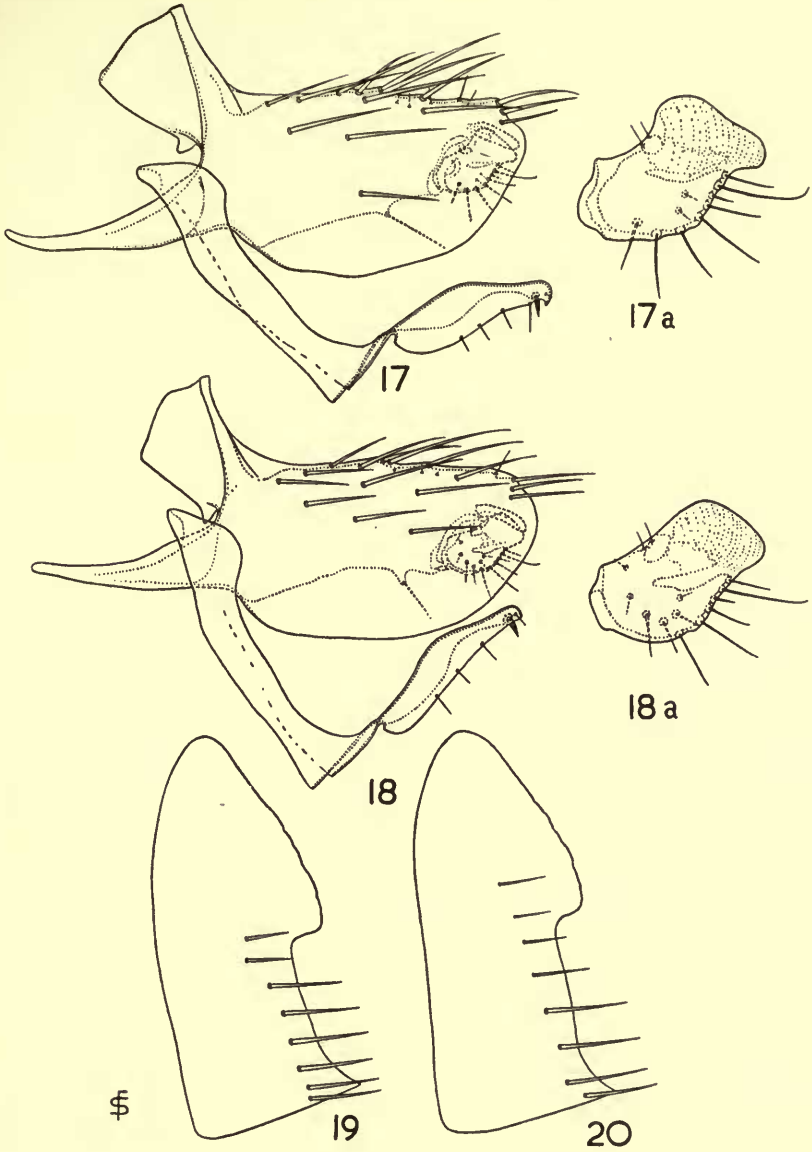
DESCRIPTION : HEAD (Fig. 13, cf. Fig. 14). Dorsal margin of frons anteriorly strongly rounded ; the anterior margin of the frons slopes strongly backwards ; it is straight for most of its extent and in its lower portion rounded to form the genal margin, which is slightly longer than that of *C. townsendi*. On the frons there is a vertical ctenidium, consisting of 7 spines in the male, and 8 in the female, as is also the case in the other species ; the two species also agree in having the lowest

spine elongated and curved downwards pre-apically; the bases of these spines in *C. monticola* form an imaginary line which is parallel to the straight frontal margin, while this is not the case in *C. townsendi* owing to this species having usually a markedly convex anterior frontal margin. In front of the ctenidium a row of 5



FIGS. 13–16.

Fig. 13, *Cleopsylla monticola* n. sp. Head and pronotum of male. (Iliniza, Ecuador.) Fig. 14, *Cleopsylla townsendi* Rothschild. Head and pronotum of male. (Carhuamayo, Peru.) Fig. 15, *Cleopsylla monticola* n. sp. Spermatheca (Allotype.) Fig. 16, *Cleopsylla townsendi* Rothschild. Spermatheca and genital ducts. (Tacna, Peru.)



FIGS. 17, 17*a*, 18, 18*a*, 19, 20.

Fig. 17, *Cleopsylla monticola* n. sp. Clasper and sternum IX. (Iliniza, Ecuador.) Fig. 17*a*, *Cleopsylla monticola* n. sp. Movable process of clasper. (Iliniza, Ecuador.) Fig. 18, *Cleopsylla townsendi* Rothschild. Clasper and sternum IX. (Carhuamayo, Peru.) Fig. 18*a*, *Cleopsylla townsendi* Rothschild. Movable process of clasper. (Carhuamayo, Peru.) Fig. 19, *Cleopsylla monticola* n. sp. Sternum VII of female. (Allotype.) Fig. 20, *Cleopsylla townsendi* Rothschild. Sternum VII of female. (Tacna, Peru.)

setae, the fourth seta from above being the longest. The genal ctenidium consists of 5 spines, the lowest of which is a little longer than the others and partly concealed by its neighbour, while the small most dorsal spine is placed on the broad, rounded genal process and is rather variable in size. Clava of antenna somewhat broader than that of *C. townsendi*; antennal fossa dorsally bordered by one or two small setae, in contrast with *C. townsendi*, where there are many more such setae. Chaetotaxy of the postantennal region of the head virtually the same in the two species, except that in the new species the setae, like most of the other setae, are slightly longer than in *C. townsendi*.

THORAX. Pronotum (Fig. 13, cf. Fig. 14) with two rows of setae and a ctenidium of 25–28 spines in the male and 25–27 in the female (in *C. townsendi*, male with 22–25, female with 21–26 spines); the sharply pointed straight pronotal spines gradually decrease in length from above downwards in both species. Pronotum dorsally longer than the uppermost spines, while the reverse is true for *C. townsendi*; mesothorax and metathorax as in the latter species.

LEGS (Fig. 21, cf. Fig. 22). A row of short spiniform setae on the inner side of the hind coxa. The chaetotaxy of the posterior margin of the tibiae of the two species is different and the differences described and figured here are taken from the hind tibia: the two median groups of strong setae arising from notches in the posterior margin consist of 3 setae in both species, but in the new species the innermost seta is displaced downwards and has become marginal, thus causing the tibia to possess a false comb, while in *C. townsendi* the innermost seta of the two groups is in line with the other two setae and therefore the more primitive condition is retained here.

ABDOMEN. Terga I–V in the male with 2–4, 2–4, 3, 3, 2–3 apical spinelets respectively on each side, in the female 2–3, 3, 1–2, 1–3, 1–2 respectively; for *C. townsendi* these figures are: in the male 2–3, 2–3, 1–2, 1–2, 1, and in the female 2–3, 2–3, 1–2, 1–2, 1. The chaetotaxy of the first 7 abdominal segments is virtually the same in the two species.

MODIFIED ABDOMINAL SEGMENTS: MALE (Fig. 17, cf. Fig. 18). Movable process of clasper (Fig. 17*a*) with its apex expanded both anteriorly and posteriorly, the posterior expansion forming a conspicuous lobe which is almost absent in *C. townsendi* (Fig. 18*a*). The distal arm of sternum IX tends to be slightly broader than that of *C. townsendi*. In other respects the modified segments, as also the phallosome, are very much alike in the two species.

FEMALE (Figs. 15, 19, cf. Figs. 16, 20). Posterior margin of sternum VII with a long and shallow sinus, similar to that in *C. townsendi* though shorter; the row of setae extends upwards to a point level with the lower margin of the lobe of the posterior margin of the sternum, while in *C. townsendi* it extends to above this point. Spermatheca markedly different from that of the Peruvian species, its tail being much shorter and stouter and internally finely striated (instead of reticulate) and the striae on the inside of the reservoir are less dense. The genital ducts could not be made out in the two females available.

LENGTH of male, 2 mm.; female, 2½ mm.

REMARKS. *Cleopsylla townsendi* is known to occur in places at high altitudes in Peru (between 12,000 and 16,000 ft.) and the same seems to be true for the new

species described above, for all specimens of the latter were collected on three of the highest mountains in Ecuador, namely Chimborazo (altitude ± 20,500 ft.), Pichincha (altitude ± 16,000 ft.) and Iliniza (altitude ± 17,500 ft.). Though the altitude is not given on the slide labels, it seems safe to assume that the specimens were collected well above 10,000 ft., near the timber line.

It should be noted that the paratypes of *Cleopsylla monticola* were recorded by Jordan (1931) under the name of *Cleopsylla townsendi*, and also that (contrary to his belief at that time) the supposed inaccuracy in his drawing of the tail of the spermatheca of *C. townsendi* does not exist, the drawing being perfectly accurate and the difference in the spermatheca being specific.

Plocopsylla phyllisae, n. sp.

(Figs. 25, 26, 28, 30)

TYPE MATERIAL. Holotype male from Guamani, Ecuador, July, 1931, ex *Oryzomys* sp., collected by F. Spillmann.

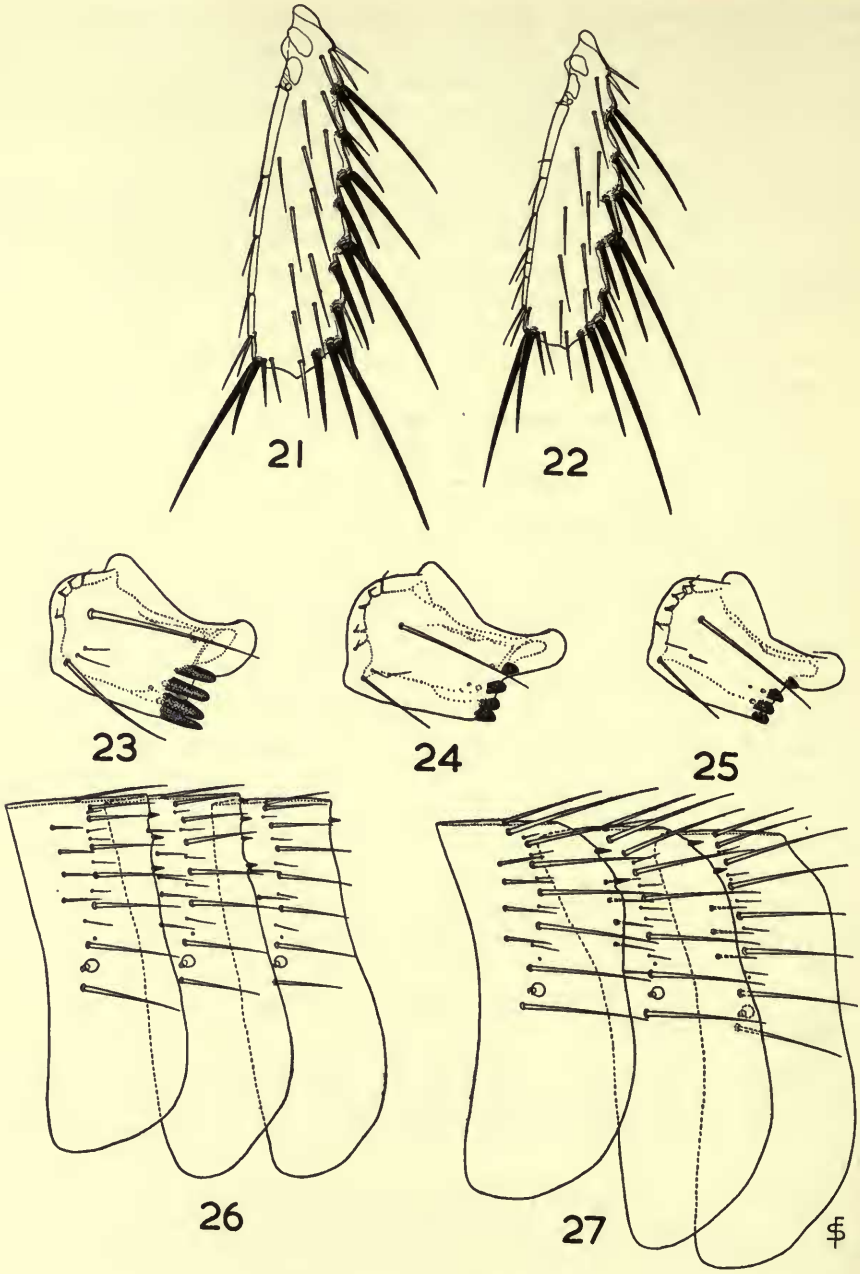
DIAGNOSIS. The new species is related to *Plocopsylla phobos* Jordan, but differs in the male by the spines of the genal ctenidium being much more strongly reduced, by the typical abdominal terga not being rounded off dorso-posteriorly, and by having a broader clasper and a differently shaped movable process and spiniform on the inner side of the latter; moreover, the sterna IX of the two species are not alike and the hind tibiae differ in their chaetotaxy. Female unknown.

DESCRIPTION: HEAD (Fig. 25, cf. Figs. 23, 24). Prectenidial part of head narrower than the "helmet"- ctenidium, which consists of 14 spines on each side. In other respects the head is extremely like that of *P. phobos*, except that the four genal spines are strongly reduced in size, which is not the case in the male of any other known *Plocopsylla*, and in the female sex such small genal spines are only found in *P. phobos* (which could imply that the females, attributed to *P. phobos*, are not that species).

THORAX. Very similar to that of *P. phobos*; in both species the pronotal ctenidium consists of 14 spines.

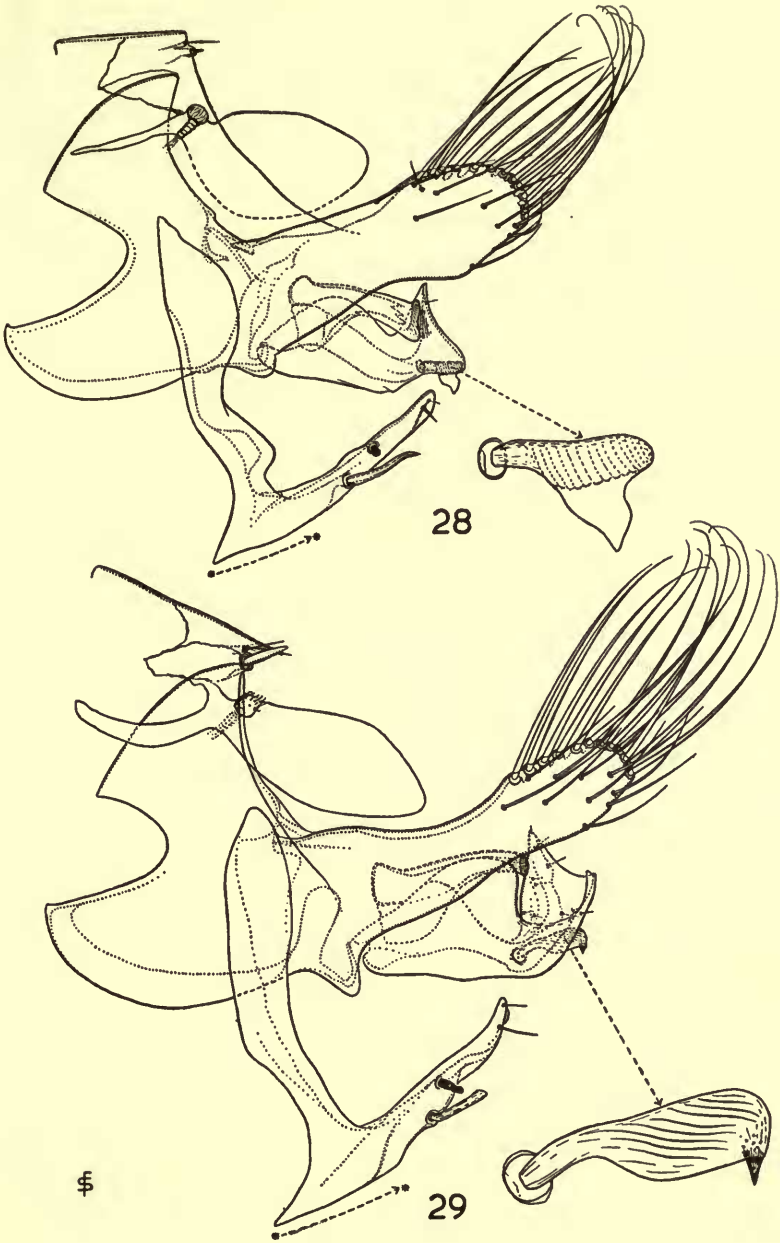
LEGS (Fig. 30, cf. Fig. 31). The setae at the posterior (dorsal) margin of the hind tibia are much thinner and therefore grouped more closely together than in *P. phobos*, while the fourth notch from the apex bears only 2 setae as against 3 in *P. phobos*.

ABDOMEN (Fig. 26, cf. Fig. 27). Chaetotaxy of terga I–VII and of sterna II–VII similar to that of *P. phobos*, but the setae are much shorter than in the latter species. The shape of the terga is quite normal (Fig. 26), but stress should here be laid upon the shape of those of *P. phobos*: in the male of that species the dorsal part of the posterior margin of terga II–VI is rounded and forms no distinct angle with the dorsal margin (Fig. 27). This is an interesting form of sexual dimorphism, since in the female of *P. phobos* the terga are normally shaped (as in Fig. 26). Similar modified terga are found in the males of *P. wolffsohni* (Rothschild) and *P. chiris*



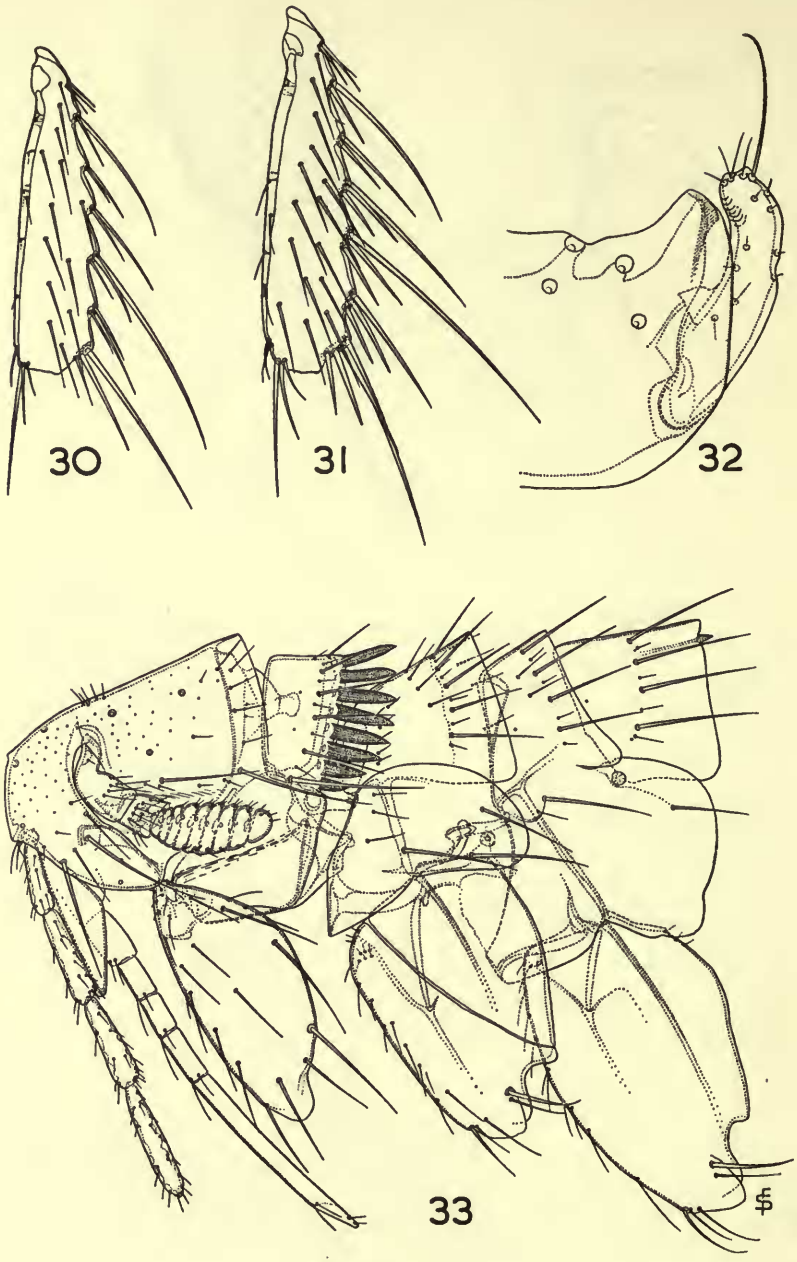
FIGS. 21–27.

Fig. 21, *Cleopsylla monticola* n. sp. Hind tibia of male. (Iliniza, Ecuador.) Fig. 22, *Cleopsylla townsendi* Rothschild. Hind tibia of male. (Carhuamayo, Peru.) Fig. 23, *Plocopsylla phobos* Jordan. Gena of male. (Holotype.) Fig. 24, *Plocopsylla phobos* Jordan. Gena of female. (Guamani, Ecuador.) Fig. 25, *Plocopsylla phyllisae* n. sp. Gena of male. (Holotype.) Fig. 26, *Plocopsylla phyllisae* n. sp. Terga III–V. (Holotype.) Fig. 27, *Plocopsylla phobos* Jordan. Terga III–V. (Holotype.)



FIGS. 28, 29.

Fig. 28, *Plocopsylla phyllisae* n. sp. Modified abdominal segments. (Holotype.) Fig. 29, *Plocopsylla phobos* Jordan. Modified abdominal segments. (Holotype.)



FIGS. 30–33.

Fig. 30, *Plocopsylla phyllisae* n. sp. Hind tibia of male. (Holotype.) Fig. 31, *Plocopsylla phobos* Jordan. Hind tibia of male. (Holotype.) Fig. 32, *Craneopsylla minerva minerva* (Rothschild). Apex of clasper. (Villa Carolina, Rio Lavallen, Argentina.) Fig. 33, *Megarthroglossus jamesoni* n. sp. Head, thorax and coxae. (Holotype.)

(Jordan), and the former is also sexually dimorphic in this respect, like *P. phobos*, while the sole known female of *P. chiris* lacks the abdomen. Terga I–V with 4–5, 3–4, 3–4, 3–4, 1–1 apical spinelets respectively (in *P. phobos*: 3–4, 3–4, 2–3, 1–2, 0 respectively). Of the two antesensilial setae the upper one is a thin and very small seta, and the lower, which in the other species of *Plocopsylla* (except *P. enderleini* Wagner, where antesensilial setae are absent in the male) is quite normally developed, though sometimes rather short, is vestigial.

Modified abdominal segments of male (Fig. 28, cf. Fig. 29). Apodeme of tergum IX and manubrium less broad than in *P. phobos*, but the corpus of the clasper is distinctly broader than in the latter, its dorsal margin being almost straight; the dorso-apical margin is bordered by a fringe of 12 long setae. Movable process of clasper far less broad basally than that of *P. phobos*, and with a sharply pointed apex; the modified spiniform seta on the inner side of the movable process differs markedly from those in all other representatives of the genus by having a downward-pointing triangular thin extension. As is usual in all members of this genus and also in those of the other genera of the subfamily Craneopsyllinae, a distinct non-setiferous process is attached to the inside of the corpus of the clasper near the dorsal part of the base of the movable process. This lateral process is always associated with the latter, and a useful hint as to its origin and function is given by the structure of the clasper of *Craneopsylla minerva minerva* (Rothschild) (Fig. 32). Here we see that on the inner side of the clasper, along the margin of the dorso-apical angle, the surface is partly sclerotized and striated; opposite this the movable process has a striated patch on its outer side. In *Plocopsylla* the clasper is extended further backwards and the apex of the movable process does not reach the apex of the clasper; since the inner striated sclerotization is so closely associated with the movable process, it has moved inwards and developed into a rodlike structure. The function of this process could be (*a*) to act as a locking device for the movable process or (*b*) to serve as a stridulatory organ (in connection with the corresponding striated area of the movable process).[1] Posterior margin of proximal arm of sternum IX more irregular than that of *P. phobos*; the distal arm bears 2 modified setae, the one at the ventral margin being spiniform with a slightly curved apical part, the other is extremely short and has a very blunt apex.

Length of male, 2 mm.

Remarks. If the relative development of the genal spines in the two sexes of this new species is the same as it is in *P. phobos* (where these spines are well developed in the male and strongly reduced in the female), the unknown female of *P. phyllisae* might be expected to possess at most vestiges of genal spines, a condition confined in known Stephanocircidae to *Barreropsylla excelsa* Jordan (see the paper by K. Jordan in the same issue of this *Bulletin*).

The new species is named after Miss Phyllis T. Johnson, Entomologist of the Walter Reed Army Medical Center, Washington, D.C., in appreciation of her great interest in the flea fauna of South America.

[1] Though the latter suggestion seems less likely than the first one, it would be of interest if South American entomologists would try out the experiments which Ossiannilsson performed with Auchenorrhynchous Homoptera (*Opusc. ent.*, 1946, 82–84) in order to prove whether or not these fleas can sing.

Family Hystrichopsyllidae

Subfamily Anomiopsyllinae

Megarthroglossus jamesoni, n. sp.

(Figs. 33–36)

Type material. Holotype male and allotype female: Pine Nut Mountains, Douglas County, Nevada, U.S.A., 25th March 1951, from the nest of *Neotoma cinerea*, collected by E. W. Jameson, Jr.

Diagnosis. The new species belongs to the group of species of *Megarthroglossus* which normally have a pronotal ctenidium consisting of 16 spines, i.e., *M. sicamus* Jordan & Rothschild, *M. bisetis* Jordan & Rothschild and *M. becki* Tipton & Allred, and is easily separable from these in the male by the shape of sternum VIII, the posterior margin of which has no marked ventral incision, and moreover its posterior margin is almost straight and does not form a lobe; the female differs from the others of the group by the combination of the following characters: the possession of 3 antesensilial setae each side, sternum VII without a lateral sinus, and the appendix of the spermatheca being less than twice as long as its reservoir, which has no distinct "collar."

Description. head and thorax (Fig. 33) similar to those of the other members of the genus; pronotal ctenidium consisting of 16 spines; abdominal terga I and II each with 1–1 apical spinelets respectively in the male; in the female there is only 1 spinelet on one side of tergum I.

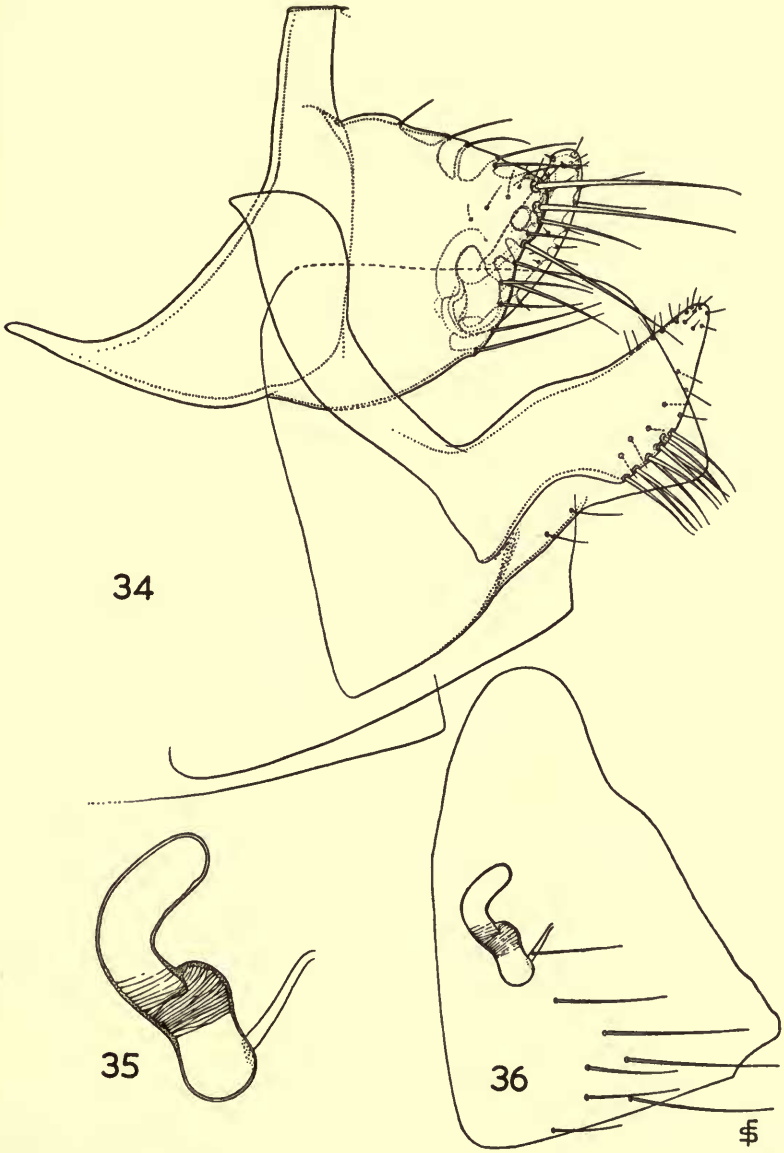
Modified abdominal segments: male (Fig. 34). Sternum VIII without a trace of a ventral incision of its posterior margin; the posterior hyaline part of this sternum with an almost straight posterior margin which forms no lobe; the length of the entire ventral margin of sternum VIII equals that of sternum VII. Clasper with 6 slender setae along its dorsal margin, a short row of about 6 small setae on its inner side from above the acetabulum to the dorso-apical angle and with 11 long and medium-sized setae distributed along the whole of the posterior margin. Movable process elongate, smoothly and slightly convex posteriorly, its apex obliquely truncate; none of its setae stout.

Female (Figs. 35, 36). Tergum VII with 3 antesensilial setae each side. Posterior margin of sternum VII with a ventral sinus but without a lateral sinus; with a main row of 5 setae and in front of the lower setae about 3 additional ones. Appendix of spermatheca about one and a half times as long as the reservoir, the "collar" of which (the part which is striated on the inside) only bulges dorsally, while the lower margin of this collar is straight and in line with the lower basal margin of the appendix.

Length of male, 1½ mm.; female, 2 mm.

Remark. This new species of the Western North American genus *Megarthroglossus* is named after my colleague Dr. E. W. Jameson, Jr., of the University of

California, who himself collected the two specimens, and most kindly allowed me to describe them and to incorporate the holotype and allotype in the British Museum collection at Tring.



FIGS. 34–36.

Fig. 34, *Megarthroglossus jamesoni* n. sp. Clasper, sterna VIII and IX. (Holotype.) Fig. 35, *Megarthroglossus jamesoni* n. sp. Spermatheca. (Allotype.) Fig. 36, *Megarthroglossus jamesoni* n. sp. Sternum VII and spermatheca. (Allotype.)

Subfamily CTENOPHTHALMINAE

Palaeopsylla similis peusi, n. ssp.

(Figs. 37 and 39)

TYPE MATERIAL. Holotype male and allotype female: Zerma, Rui Mountain, East Serbia (on the border of Bulgaria, 42° 54′ N. 22° 33′ E.), 25th July, 1935, ex *Talpa europaea pančiči* (= *Talpa europaea europaea*), collected by N. Zemčuznikov. Paratypes: two males and one female with same data as holotype and allotype.

DIAGNOSIS. Separable from the nominotypical subspecies, *Palaeopsylla similis similis* Dampf, in the male by the convex dorsal margin of the clasper, by the wider base and narrower apex of the movable process and by the more strongly serrate posterior margin of the proximal arm of sternum IX; in the female by the shape of sternum VII, the posterior margin of which has no sinus below its dorsal lobe.

DESCRIPTION. Except for differences in the terminal segments, the new subspecies is indistinguishable from the nominotypical subspecies.

MODIFIED ABDOMINAL SEGMENTS: MALE (Fig. 37, cf. Fig. 38). Dorsal margin of corpus of clasper distinctly convex, its dorso-apical angle rather acute and projecting a little above the point of insertion of the seta on the posterior margin. Manubrium similar to that of the nominotypical subspecies, and like that of the latter showing a certain amount of variation in its width. Movable process of clasper straight, with a broad triangular base; the anterior (or dorsal) margin narrows abruptly near the apex, and from the apical angle the margin rounds off to continue as the posterior margin; in the nominotypical subspecies the anterior margin is smoothly rounded near the apex, but the apical and posterior margins meet at a right angle. Chaetotaxy of the movable process in the two subspecies rather similar. Sternum IX in subspecies *peusi* is very similar to that of the nominotypical subspecies, but the posterior margin of the proximal arm is much more strongly serrate over a somewhat longer distance; also the apex of the distal arm widens a little less abruptly.

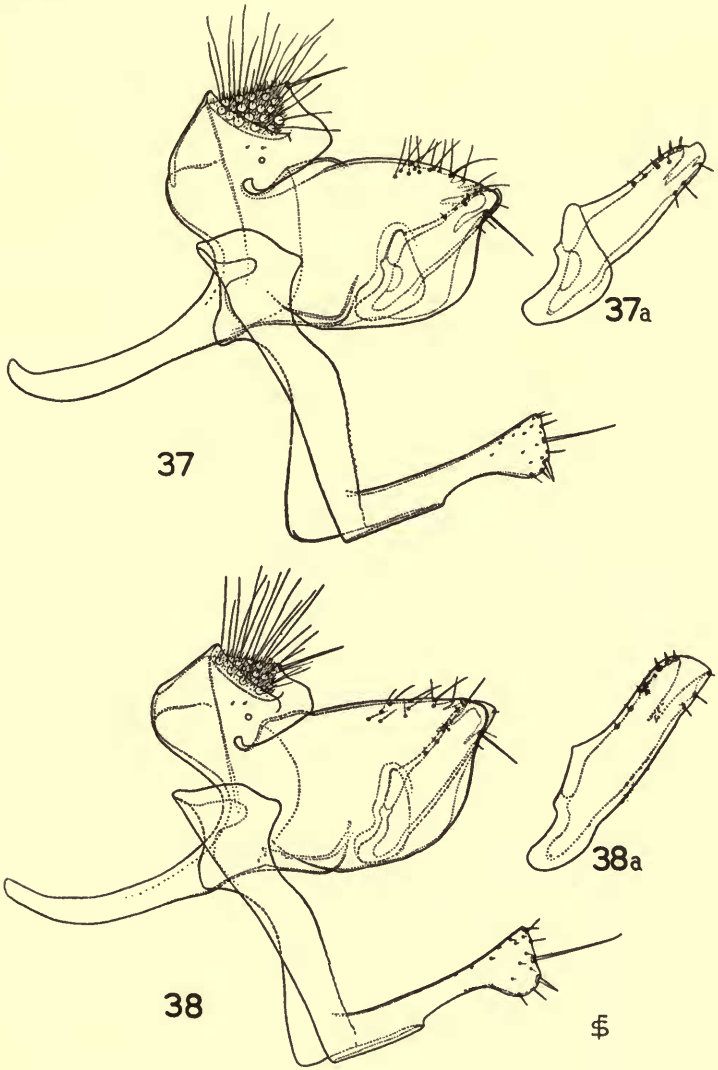
FEMALE (Fig. 39, cf. Fig. 40). Sternum VII with a row of 5 or 6 stout setae, as in the nominotypical subspecies, but the uppermost seta is shifted more forwards (backward from the row); the posterior margin of this sternum has a broad dorsal lobe below which the margin slants backwards, but without forming a distinct sinus, as is the case in the nominotypical subspecies. The reservoir of the spermatheca seems to be narrower than that of *P. similis similis*, but such forms also occur in the latter, where likewise the part near the orifice may sometimes be distended ventrad.

LENGTH of male, 1¾–2 mm.; female, 2½ mm.

REMARKS. *Palaeopsylla similis similis* Dampf is widely distributed in Eastern Europe and is known to occur in East and South-east Germany, Austria, Hungary, Northern Yugoslavia, Roumania, Bulgaria and European Russia; throughout its range of distribution it is a specific parasite of the mole (*Talpa europaea*).[1] *P.*

[1] The occurrence of one specimen, which is in the Tring collection, on *Sorex araneus*, caught on the Glatzer Schneeberg, Silesia, is beyond any doubt accidental, since other specific parasites of the mole are occasionally found on *Sorex* and vice versa.

similis peusi is so far only known from the Rui Mountain on the Serbian-Bulgarian border, and there also is a specific parasite of the mole. The Rui Mountain may well be one of the most north-eastern points of distribution of *P. s. peusi*, since *P. s.*



FIGS. 37, 37*a*, 38, 38*a*.

Fig. 37, *Palaeopsylla similis peusi* n. ssp. Clasper and sternum IX. (Holotype.) Fig. 37*a*, *Palaeopsylla similis peusi* n. ssp. Movable process of clasper. (Holotype.) Fig. 38, *Palaeopsylla similis similis* Dampf. Clasper and sternum IX. (Nove Stbske, Pleso, High Tatra.) Fig. 38*a*, *Palaeopsylla similis similis* Dampf. Movable process of clasper. (Nove Stbske, Pleso, High Tatra.)

similis has been found in south-west Bulgaria at Rhodope and Karlik, which localities are situated south-easterly of the Rui Mt. The new subspecies probably occurs in Albania and the northern part of Greece.

I have great pleasure in naming this new subspecies after my friend and colleague Prof. Dr. F. Peus, who, through his excellent work, has contributed greatly to our knowledge of European fleas.

Family Ischnopsyllidae

Subfamily Ischnopsyllinae

Description of the hitherto unknown male of ***Ischnopsyllus consimilis*** (Wahlgren), 1904.

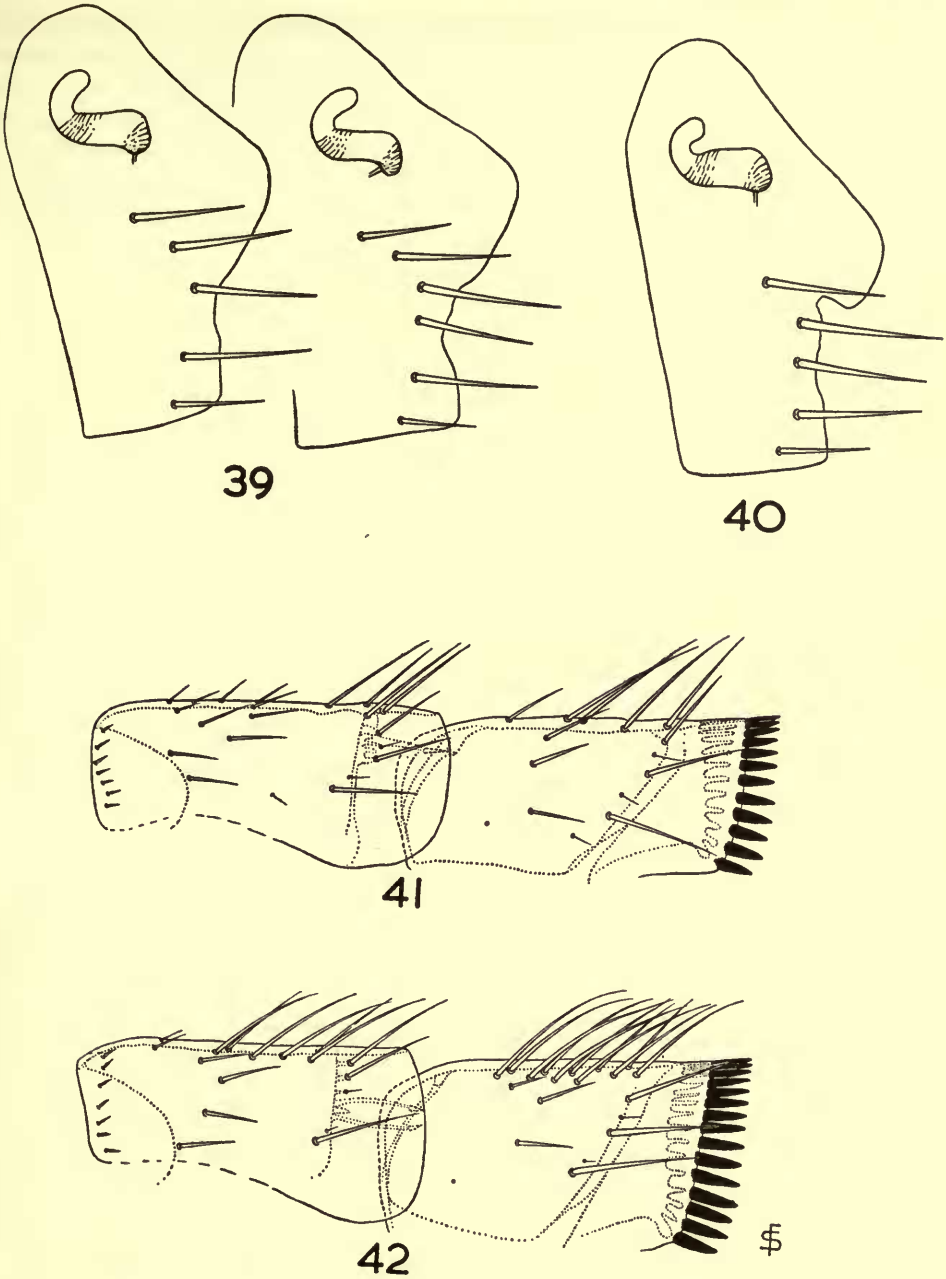
(Figs. 41, 43, 44)

Lt.-Col. R. Traub, Chief of the Department of Entomology, Walter Reed Army Medical Center in Washington, D.C., most kindly sent me a male of an Egyptian bat flea of the genus *Ischnopsyllus* for study and comparison with the representatives of this genus in the Tring collection. Though this male does not agree with any described male of *Ischnopsyllus*, albeit closely related to *I. octactenus* (Kolenati), I thought it could well be the unknown male of *Ischnopsyllus consimilis* (Wahlgren), 1904, which was described from a single female collected in the neighbourhood of Cairo, Egypt, ex *Rhinopoma microphyllum* ; unfortunately this type-specimen must be considered lost. From Wahlgren's description one deduces that *consimilis* must be extremely closely related to *octactenus*, and it was even thought that it might be a synonym of the latter. The description of *I. consimilis* deals mainly with such unsatisfactory characters as counts of setae, which agree rather well with the numbers of the Egyptian male (taking into account small differences which may be sexual) ; the numbers of spines in the ctenidia of the two sexes agree very well. Since both the female holotype of *I. consimilis* and the Egyptian male *Ischnopsyllus* are closely related to *I. octactenus*, and differ from it in similar respects, it seems a safe assumption that the male belongs to Wahlgren's species.

I am greatly indebted to Colonel Traub and also to the collector of this male, Mr. P. Quentin Tomich, for allowing me to describe the specimen. It is characteristic of Colonel Traub's great generosity that he has presented this unique specimen to the British Museum collection of Siphonaptera at Tring.

Data. One male ex *Pipistrellus kuhli*, 5 miles west of Simbellawein (i.e., 12 miles south of Mansura), Dakahlia Province, [Lower] Egypt, 26th February, 1947, collected by P. Quentin Tomich.

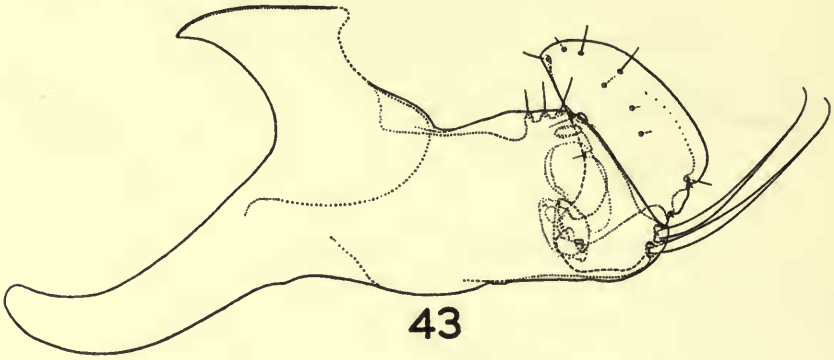
Diagnosis. Closely related to *Ischnopsyllus octactenus* (Kolenati), but differs in the following characters : mesonotum and metanotum each with only a few semi-erect setae forming a " mane " ; dorso-apical angle of clasper obtuse, strongly rounded ; sternum VIII broader, with an oblique and rounded apex ; sternum IX

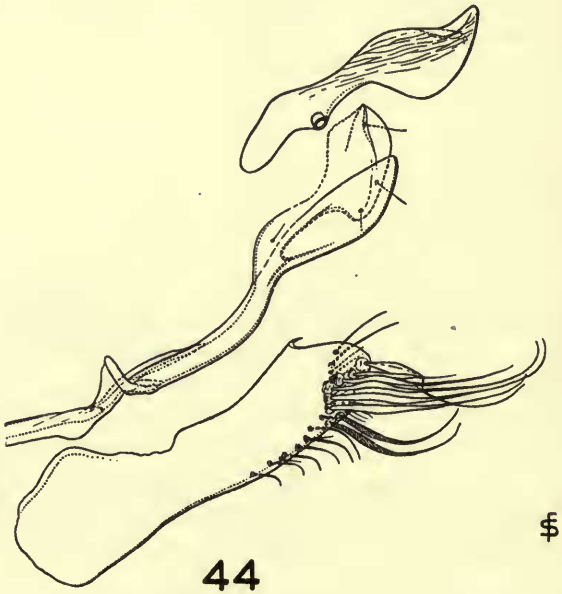


Figs. 39–42.

Fig. 39, *Palaeopsylla similis peusi* n. ssp. Sternum VII and spermatheca of two females. (Zerma, Rui Mt., Serbia.) Fig. 40, *Palaeopsylla similis similis* Dampf. Sternum VII and spermatheca. (Moscow, Russia.) Fig. 41, *Ischnopsyllus consimilis* (Wahlgren). Mesonotum and metanotum of male. (Simbellawein, Egypt.) Fig. 42, *Ischnopsyllus octactenus* (Kolenati). Mesonotum and metanotum of male. (S. Felíu de Guixols, Spain.)

differs in details of the apical half of the distal arm ; crochet of phallosome with an upturned apex. Female : From the information available (i.e., Wahlgren's original description) the only difference from *I. octactenus* seems to be in the number of spines in the pronotal ctenidium, namely 26 as against 29–32 in *I. octactenus*, though this difference may not be genuine, since Wahlgren stated, " Da ich nur ein Exemplar zu untersuchen gehabt habe, sind die Stachelzahlen der grösseren Kämme (der beiden thorakalen und des zweiten und dritten abdominalen) insoweit unsicher, als ein Irrtum bis auf zwei Stacheln nicht völlig ausgeschlossen ist."





FIGS. 43, 44.

Fig. 43, *Ischnopsyllus consimilis* (Wahlgren). Clasper. (Simbellawein, Egypt.) Fig. 44, *Ischnopsyllus consimilis* (Wahlgren). Aedeagal crochet, sternum IX and sternum VIII. (Simbellawein, Egypt.)

DESCRIPTION. The number of spines in the eight ctenidia of *I. consimilis* and *I. octactenus* are compared below:

	I. consimilis ♂	*I. octactenus* ♂	*I. consimilis* ♀	*I. octactenus* ♀
Pronotum	25	28–31	26	29–32
Metanotum	25	28–32	24	25–31
Tergum I	12	11–18	12	11–15
,, II	22	20–28	20	21–27
,, III	20	19–22	18	16–22
,, IV	17	15–18	18	13–18
,, V	13	11–16	14	9–14
,, VI	13	9–13	12	9–13

HEAD. Practically indistinguishable from that of *I. octactenus*.

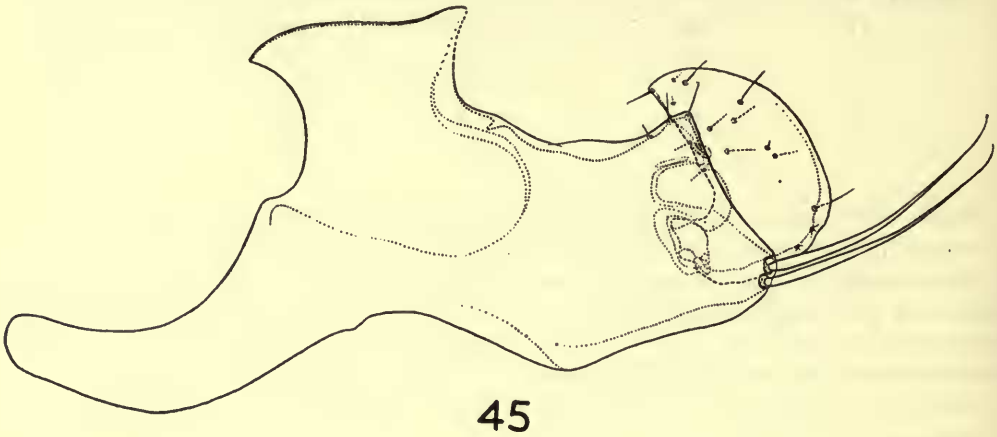
THORAX. Pronotum like that of *I. octactenus*, except for the number of spines in the ctenidium; mesonotum and metanotum each with about 4 or 5 semi-erect setae near the dorsal margin (Fig. 41), while in *I. octactenus* these are much more numerous (Fig. 42). In other respects the thorax, as also the legs, show no noticeable differences between the two species under discussion.

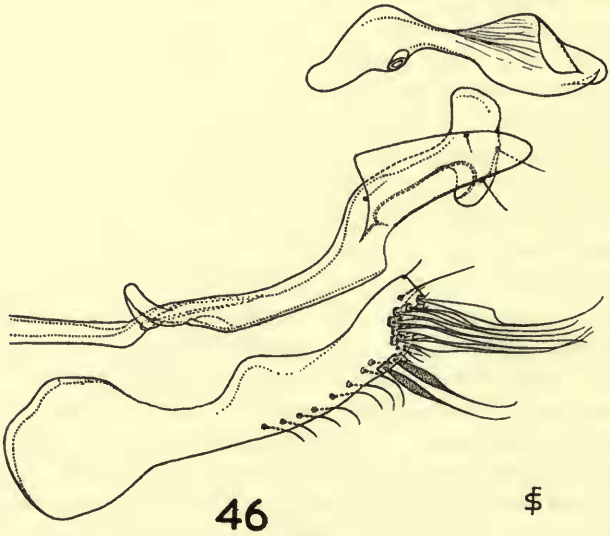
ABDOMEN. Segments I–VII similar to those of *I. octactenus*; for the numbers of spines in the tergal ctenidia, see above.

MODIFIED ABDOMINAL SEGMENTS OF MALE (Figs. 43, 44, cf. Figs. 45, 46). Apodeme of tergum IX rather broad; manubrium curved upwards, narrowing towards the apex; the upper margin of the manubrium near the ventro-anterior part of the margin of the apodeme shows no lobe as in *I. octactenus*, but this lobe is also quite frequently absent, or at most indicated, in the latter species, so it is likely that specimens of *I. consimilis* possessing this lobe may be found in the future. The dorso-apical angle of the clasper is strongly obtuse and rounded off; along the dorsal margin near the angle there are the usual 3 small setae; posterior margin of clasper almost straight; of the 2 acetabular setae the lower is slightly stouter than the upper; the ventral margin of the clasper forms a rather straight line. Movable process of clasper crescentic, the lower half of the posterior margin fairly straight, while in *I. octactenus* it is more regularly rounded; chaetotaxy of the movable process similar to that of the latter. Sternum VIII fairly broad and straight, its proximal part being widened; dorsal margin of the distal part concave, but much less so than in *I. octactenus*; its apical margin obliquely rounded, and at the angle where the dorsal and apical margins meet there is a minute spiniform seta (in *I. octactenus* a small thin seta). On the apico-ventral part of the sternum a curved row of 6 blade-shaped long setae and in front of these, at the ventral margin, 2 more flattened setae, but like the corresponding ones in *I. octactenus* these are heavily pigmented; further proximad along the margin some 6 curved setae. Sternum IX with the distal arm apically divided into a setiferous upper lobe and a lower non-setiferous one; the latter lobe, which is the outer, is elongated and widest in its middle (in *I. octactenus* it is triangular and widest at its base); the upper part of the widened apical portion of the inner lobe much longer (from the point of junction

with the inner lobe to the apex) than the lower part (in *I. octactenus* the upper and lower parts are subequal in size). Aedeagus not substantially different from that of *I. octactenus*, but the crochet differs by having amongst other things an upturned apex; other differences can be observed by comparing Fig. 44 with Fig. 46.

LENGTH of male, 2 mm.





FIGS. 45, 46.

Fig. 45, *Ischnopsyllus octactenus* (Kolenati). Clasper. (Newport, Isle of Wight.)
Fig. 46, *Ischnopsyllus octactenus* (Kolenati). Aedeagal crochet, sternum IX and sternum VIII. (Newport, Isle of Wight.)

REMARK.—In view of the desirability of stability in nomenclature I designate the above described Egyptian male *Ischnopsyllus* as neotype of *Ischnopsyllus consimilis* (Wahlgren), 1904.

Family Amphipsyllidae

Subfamily Mesopsyllinae

Redescription of ***Caenopsylla assimulata*** (Weiss), 1913, in comparison with ***Caenopsylla mira*** Rothschild, 1909.

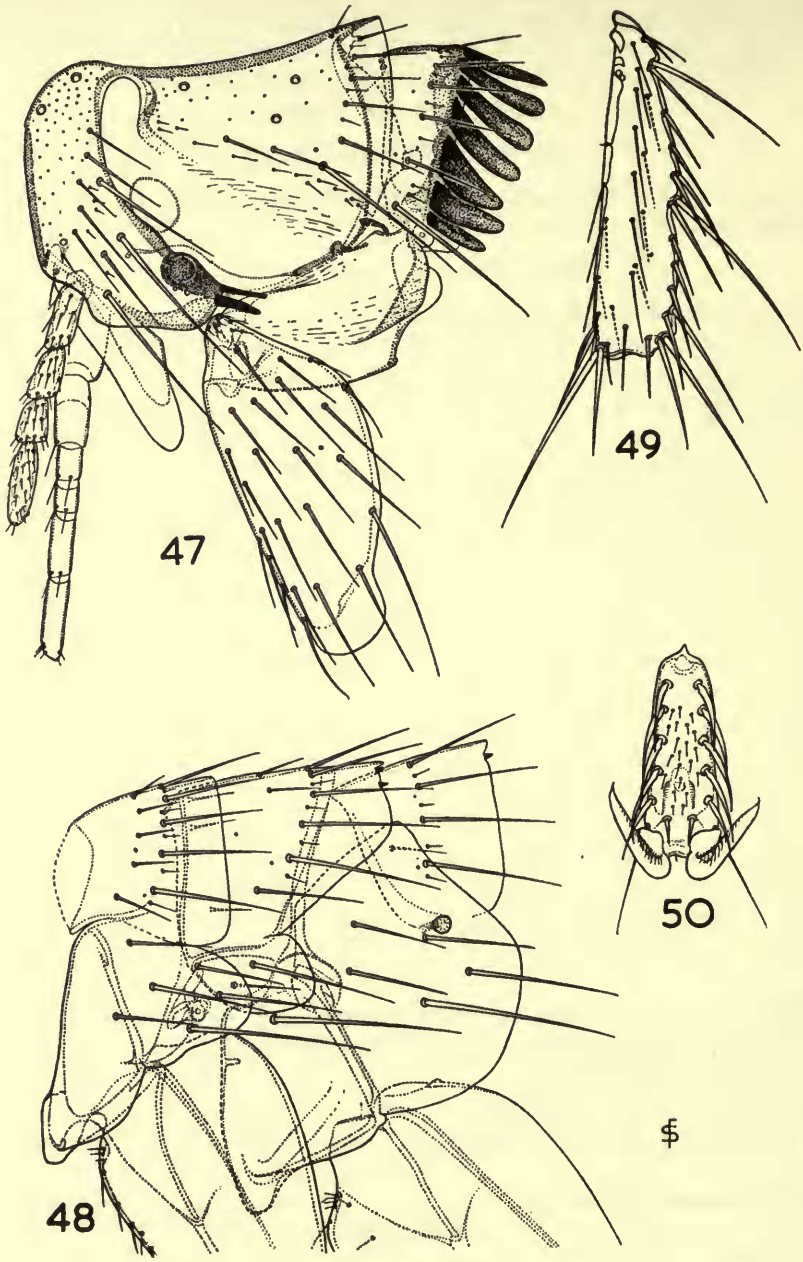
(Figs. 47–53, cf. Figs. 54–62)

Through the great kindness of Prof. E. Séguy, Sous-Directeur au Muséum National d'Histoire Naturelle, Paris, I have been able to study the male holotype of *Caenopsylla assimulata* (Weiss), which is the only known specimen of this species. Although Weiss (1913) described it at length, its true morphology and status could not be ascertained owing to the fact that the few sketchy drawings published by Weiss do not show the true diagnostic characters. It is therefore not surprising that Wagner & Wassilieff (1933) remark that ". . . le *C. assimulata* Weiss a été trouvée en Tunisie, à Matmata, sur le *Macroscelides rozeti*, mais un seul exemplaire insuffisamment décrit par A. Weiss." It is, however, not really a matter of the species being insufficiently described, since Weiss devoted nine full pages to the description of the sole specimen, but lack of detailed figures is liable to render any description, however lengthy, practically useless in the case of creatures such as fleas, where so much depends on the shape of the details of complicated structures. I fully agree with Dampf (1945), who advocates more exactness in drawings, but I would like to add that all taxonomically important parts of fleas should be treated in such a way. Detailed and accurate drawings replace, in a much more satisfactory way, large numbers of pages of descriptive matter—a fact which unfortunately is not yet wholly appreciated by many editors of periodicals. The extra expense of reproducing figures is probably more than offset by the saving in the number of pages required for a description, to say nothing of the fact that in nearly all instances descriptions of fleas unaccompanied by good and adequate figures are practically useless.

The holotype of *Caenopsylla assimulata* is not well cleared and its dorsum is much contracted ; the specimen is in the collection of the Muséum National d'Histoire Naturelle at Paris.

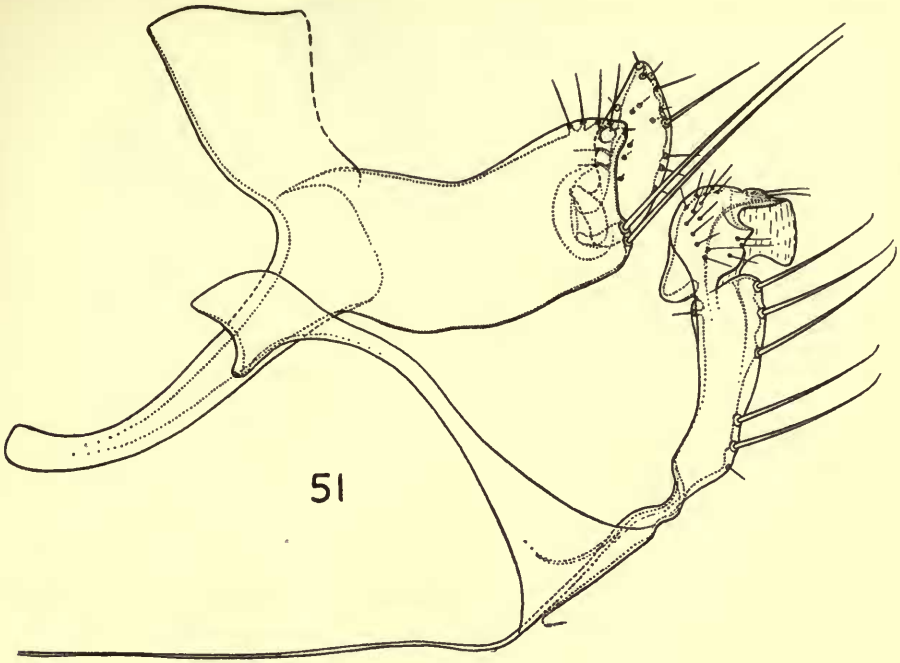
Only one other species of *Caenopsylla* is known, *C. mira* Rothschild, 1909, and therefore it seemed advisable to redescribe *C. assimulata* in comparison with *C. mira*.

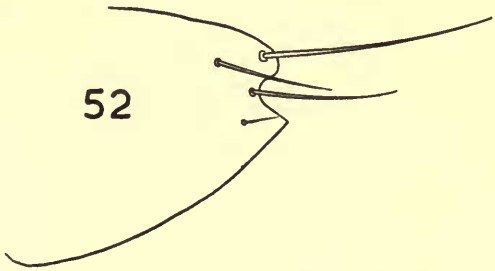
Caenopsylla assimulata (Weiss), ♂	*Caenopsylla mira* Rothschild, ♂
Diagnosis	
Pronotum rather narrow dorsally, its ctenidium straight. Hind tibia without a well-developed false comb of setae at the posterior margin. Corpus of clasper with subparallel dorsal and ventral margins ; 2 acetabular setae.	Pronotum much longer dorsally than ventrally, its ctenidium strongly curved. Hind tibia with a distinct false comb. Corpus of clasper narrowest in its middle part, the fixed process being drawn out into a long lobe ; 4 acetabular setae.

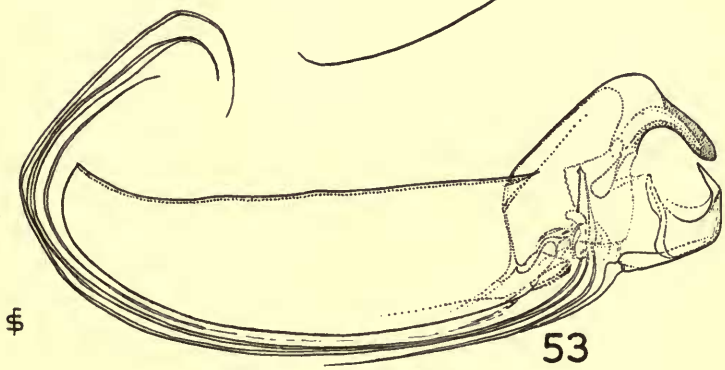


FIGS. 47–50.

Fig. 47, *Caenopsylla assimulata* (Weiss). Head and prothorax and fore coxa. (Holotype.) Fig. 48, *Caenopsylla assimulata* (Weiss). Mesothorax, metathorax and tergum I. (Holotype.) Fig. 49, *Caenopsylla assimulata* (Weiss). Hind tibia. (Holotype.) Fig. 50, *Caenopsylla assimulata* (Weiss). Last hind tarsal segment. (Holotype.)

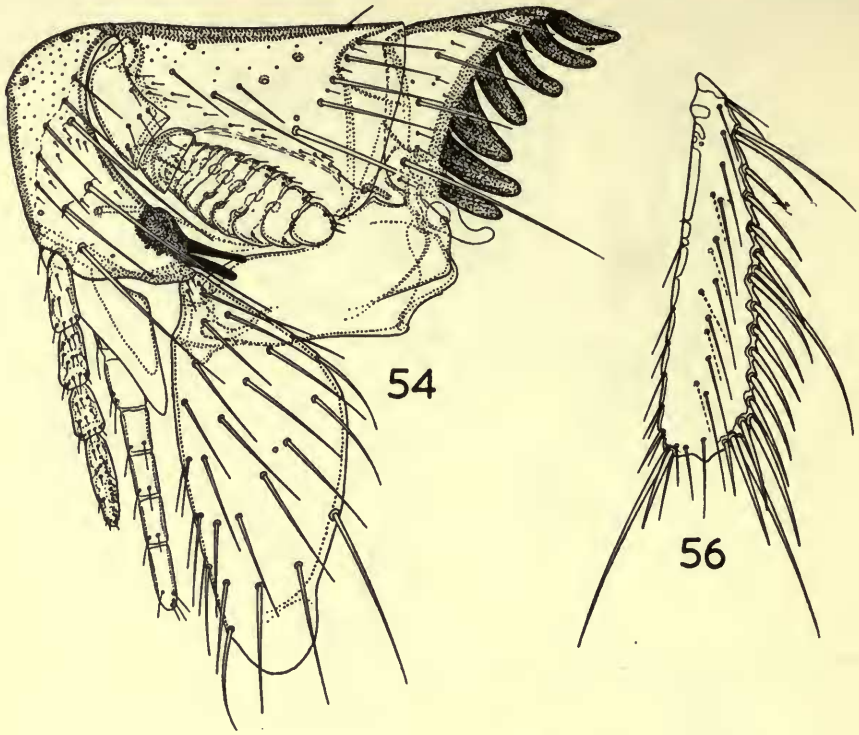


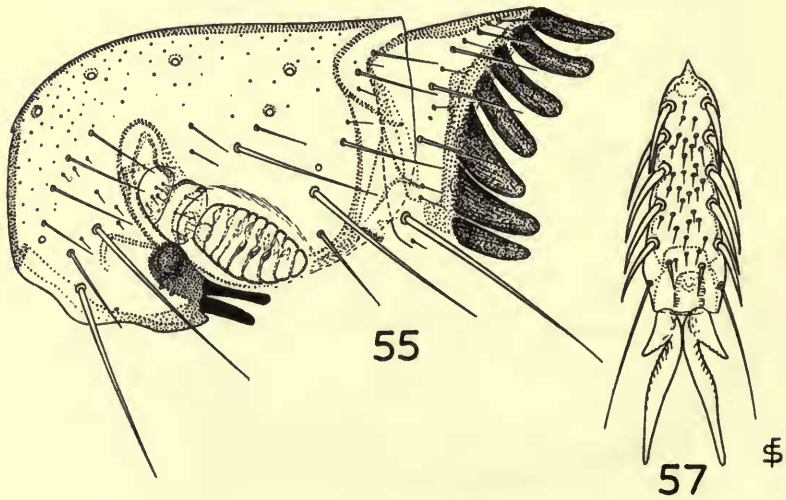




FIGS. 51–53.

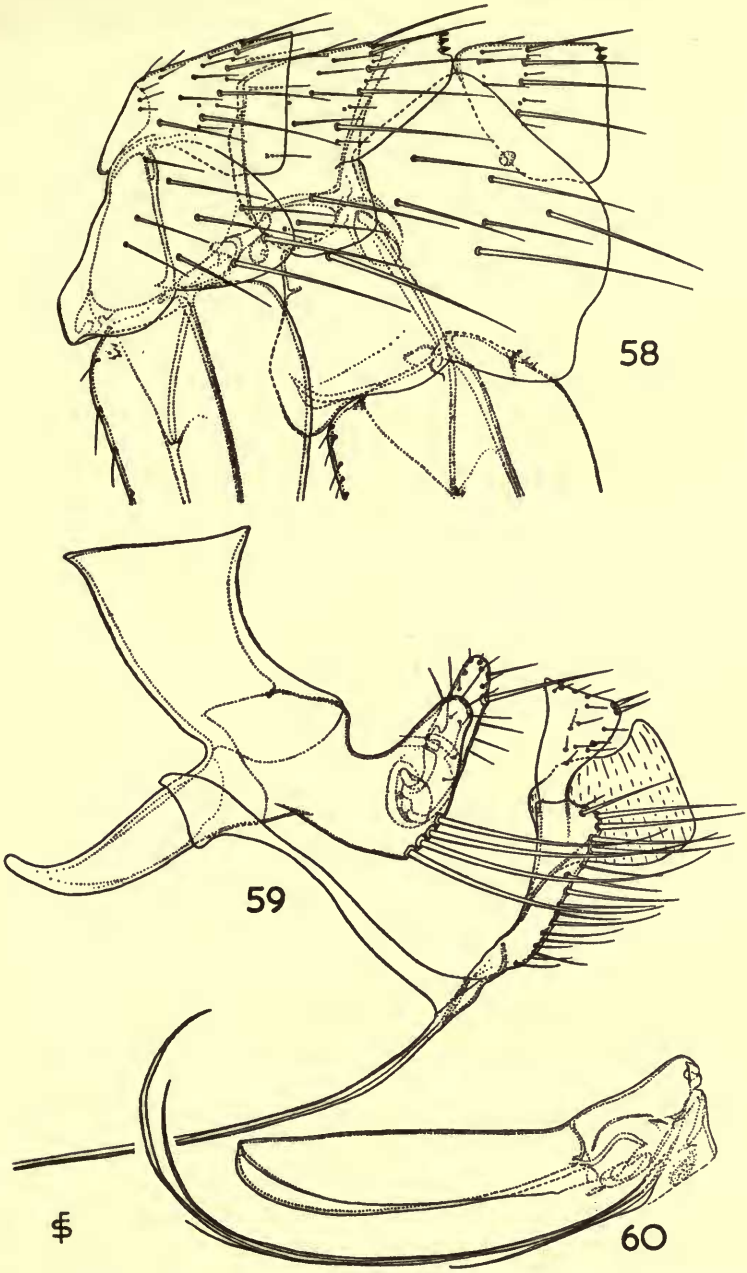
Fig. 51, *Caenopsylla assimulata* (Weiss). Clasper and sternum IX. (Holotype.) Fig. 52, *Caenopsylla assimulata* (Weiss). Sternum VIII. (Holotype.) Fig. 53, *Caenopsylla assimulata* (Weiss). Phallosome. (Holotype.)





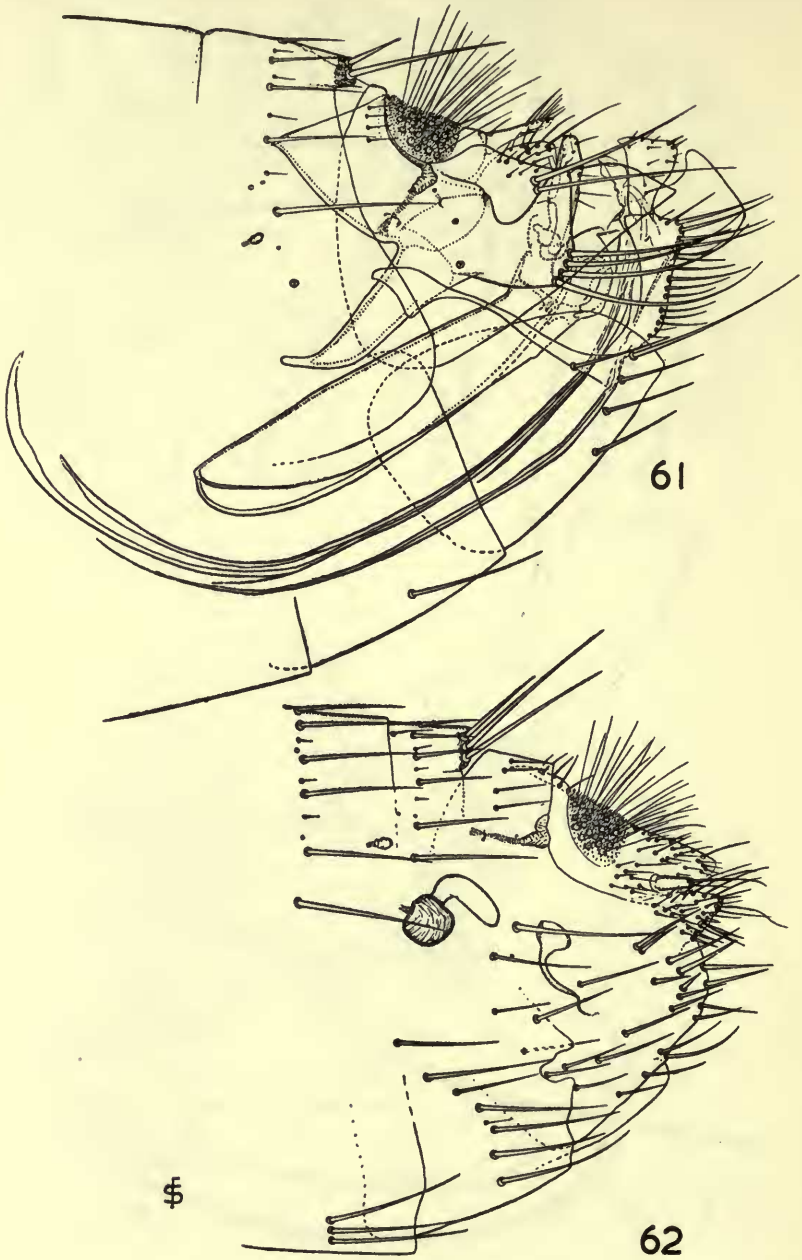
FIGS. 54–57.

FIG. 54, *Caenopsylla mira* Rothschild. Head, prothorax and fore coxa of male. (Holotype.) Fig. 55, *Caenopsylla mira* Rothschild. Head and pronotum of female. (Biskra, Algeria.) Fig. 56, *Caenopsylla mira* Rothschild. Hind tibia. (Holotype.) Fig. 57, *Caenopsylla mira* Rothschild. Last hind tarsal segment. (Holotype.)



FIGS. 58–60.

Fig. 58, *Caenopsylla mira* Rothschild. Mesothorax, metathorax and tergum I of male. (El Kantara, Algeria.) Fig. 59, *Caenopsylla mira* Rothschild. Clasper and sternum IX. (Holotype.) Fig. 60, *Caenopsylla mira* Rothschild. Phallosome. (Holotype.)



FIGS. 61, 62.

Fig. 61, *Caenopsylla mira* Rothschild. Terminalia of male. (Holotype.) Fig. 62, *Caenopsylla mira* Rothschild. Terminalia of female. (Biskra, Algeria.)

Caenopsylla assimulata (Weiss), ♂

Caenopsylla mira Rothschild, ♂

DESCRIPTION

HEAD (Fig. 47). The chaetotaxy, as well as the other characteristics of the head, can be seen in the figure, but stress should be laid upon the presence of 2 genal spines (though normal in the subfamily), the upper one of which is much thinner than the lower; of the five-segmented labial palp the 2nd and 3rd segments are subequal in length and each is about half the length of the 4th or 5th segments. The clava of each antenna is broken off, and although on the slide label is written that they are somewhere in the preparation, I have been unable to find them; pedicellus with 3 short setae.

THORAX (Figs. 47, 48). Pronotum of normal shape, with one row of 12 setae (6 each side); pronotal ctenidium consisting of 14 spines, the uppermost of the group formed on each side by the 3 lowest spines, which all lie closely against each other, is much the stoutest in the ctenidium and points obliquely downwards; the upper 4 spines on each side are slightly curved and the 2nd and 3rd from above are somewhat spatulate; they are all directed downwards like the third spine from below.

Mesonotum with a main row of 10 setae (5 each side), preceded by a row of 10 much smaller setae, both rows practically vertical. Mesosternosome with 6 setae on one side and 7 on the other; the anterior margin of the mesepisternum is long and almost vertical.

Metanotum with a main row of 12 setae preceded dorsally by only 4 small setae; its posterior margin bears dorsally two apical spinelets on each side; metepisternum with one long and one short seta; metepimeron with 5 setae on one side and 6 on the other.

LEGS (Figs. 49, 50). Hind tibia with an indistinct false comb of 8 setae along the posterior margin; the five pairs of lateral plantar setae on the fifth segment of the hind tarsus are rather slender, on the plantar surface about 20 minute setae.

HEAD (Figs. 54, 55). Chaetotaxy very much the same, but the posterior row on the postantennal region is oblique and subparallel to the row on the pronotum. The 2 genal spines are slightly stouter; segments 2–4 of the five-segmented labial palp are all of subequal length and slightly shorter than segments 1 and 5. The antenna is shown in the figures; the pedicellus also bears only 3 small setae.

THORAX (Figs. 54, 55, 58). Pronotum in both sexes much longer dorsally than ventrally, with one row of 12 setae; pronotal ctenidium consisting of the same number of similar spines, but the ctenidium is strongly curved and the 4 dorsal spines on each side are directed backwards and downwards, also the second and third from above are much less spatulate.

Mesonotum with a main row of 10 setae on both sides together, preceded by a row of 10 smaller setae; these two rows are arranged obliquely. Mesosternosome with 8–9 setae; anterior margin of mesepisternum more oblique.

Metanotum with a main row of 10 setae, preceded by a row of 8–10 setae; its posterior margin bears dorsally 3 apical spinelets on each side; metepisternum also with one long and one short seta; metepimeron extending upwards much nearer to dorsum, with 6 setae.

LEGS (Figs. 56, 57). The setae of the hind tibia forming a false comb number 12 and are stouter, hence the false comb is very distinct; the five pairs of lateral plantar setae are stouter and there are about 30 minute setae on the plantar surface.

Caenopsylla assimulata (Weiss), ♂

DESCRIPTION

ABDOMEN. Terga I and II each with one apical spinelet each side; terga I–VII respectively each with 4, 6, 6, 6, 6, 5, 4 setae in the main row on each side; on tergum VII the gap between the lowest seta and its neighbour is twice as long as the space between the 1st and 2nd or 2nd and 3rd. In front of the main row one seta on terga I and II, none at all on terga III–VII. Tergum VII with 3 antesensilial setae the lowest of which is very small. Basal sternum apparently without setae, sterna III–VII on each side with 2 setae, sternum VIII as in Fig. 52, its apical margin with a sinus.

MODIFIED SEGMENTS (Fig. 51). Shape of tergum VIII not visible in the specimen, but it bears 3 long setae. Manubrium of clasper long and narrow, not tapering in its apical portion. Corpus of clasper with subparallel dorsal and ventral margins, its apical half directed upwards; 4 slender setae along the dorsal margin near the apex; posterior margin of clasper slightly concave; 2 acetabular setae. Movable process spindle-shaped, two and a half times as long as its maximum width; besides a number of small setae it bears a fairly large one at the posterior margin at one-third its length from the apex. Apex of proximal arm of sternum IX squarish; the greater part of this arm very narrow but it widens to a triangle with a rather long base. The distal arm bears ventrally 5 long setae, and its structure is complicated and is shaped as shown in Fig. 51; the membranous flap projecting from behind the apex may belong to this sternum or it may be the aedeagal crochet; this could not be ascertained, no material being available for dissection. Aedeagal apodeme broad; for details of the phallosome, see Fig. 53.

LENGTH. 1½ mm.

HABITAT. Matmata, South Tunisia.

HOST. *Elephantulus rozeti* (which was collected by Weiss in March, 1913); it may be expected to occur on the Gundi.

Caenopsylla mira Rothschild, ♂

ABDOMEN. Terga I–III with 2–2, 1–1, 1–1 apical spinelets respectively; terga I–VII normally respectively each with 4, 6, 6, 6, 6, 6, 6 setae in the main row on each side; the setae on tergum VII are all about equally spaced. In front of the main row of terga I–III respectively 2–3, 3–4, 1–3 small setae, none at all on terga IV–VII. Similar antesensilial setae. Basal sternum with one seta along the ventral margin on each side, sterna III–VII each with 2 or 3 setae on each side, sternum VIII as in Fig. 61, its apical margin not sinuate.

MODIFIED SEGMENTS (Figs. 59, 61). Tergum VIII roughly triangular, its dorsal margin undulate, and apically this margin and the ventral one meet at a sharp angle; 2 long setae near the dorsal margin. Manubrium much broader and tapering strongly apically. Corpus of clasper with a deep sinus in its dorsal margin, which divides off the fixed process as a very distinct lobe, bearing at its apex 5 slender setae; most of the posterior margin of the clasper slightly convex; 4 acetabular setae. Movable process elongate, four times as long as its maximum width; chaetotaxy similar, but the long seta at the posterior margin is inserted at one-fourth the length of the posterior margin from the apex. Apex of proximal arm of sternum IX triangular, the narrow arm widening only a little towards its junction with the distal arm. The distal arm bears ventrally a large number of small, medium-sized and long setae; its divided-off apical part triangular, very differently shaped to that of the other species, details as in Fig. 59; the membranous flap is much larger. Aedeagal apodeme much narrower; for details of the phallosome, which is very different, see Fig. 60.

LENGTH. ♂, 2–2¼ mm.; ♀, 2¼–2½ mm.[1]

HABITAT. Biskra and El Kantara, both in Algeria.

HOST. *Ctenodactylus gundi* (occurring in Libya, Tunis, Algeria, and west to the Moroccan Atlas); the occurrence of one specimen on *Eliomys quercinus munbyanus* may be accidental.

[1] Although the female sex of this species is not dealt with here, it seemed useful to give a figure of its terminalia (Fig. 62).

REMARKS

The difference in the development of the pronotum is of interest : in *C. assimulata* we see that the pronotum is still of a more or less normal shape, but its ctenidium shows a clear tendency towards the condition found in *C. mira,* where the pronotum is dorsally widened backwards, and as a result of this the ctenidium is strongly curved and the upper spines tend to point downwards. These are obviously two stages in the evolution of the pronotum in the genus *Caenopsylla,* and it would be of interest to know whether a species of this genus with the original straight pronotal spines still exists, and also whether or not the evolution in another species has gone further, producing a pronotum more or less like that of *Barreropsylla.* In order to find the answer to this question it will be necessary to collect intensively throughout North Africa, which may unfortunately mean a delay of many years.

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